

# SNAPshot-Image Mapping Spectrometer SNAP-IMS



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National Aeronautics and  
Space Administration



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## Project Overview

- Funded through a NASA Cooperative Agreement Notice.
- Partner provides 50% of resources for project.
- One year period of performance
- The technical challenge: to effect the transition of tunable, snapshot hyperspectral imaging technology from the biomedical domain to that of Earth remote sensing by reducing instrument to 5kg and cubesat like volume.
- Benefit to NASA: Advances the MSFC science goals of developing instruments that examine Earth science processes on small and regional scales, and that benefit humanity for disaster response and public health.



## Objective

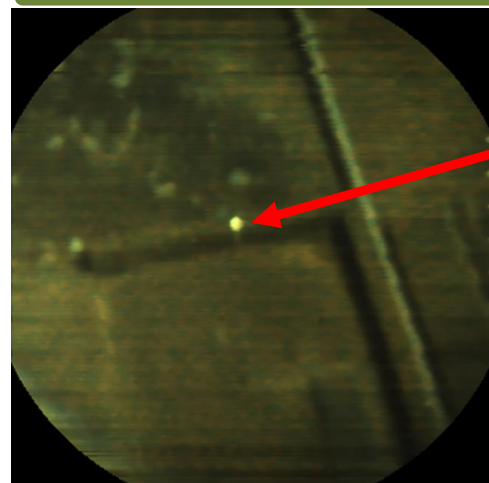
- 1) Take an existing benchtop hyperspectral imager used for medical applications and reduce it in size to  $<5\text{kg}$  and approaching a 3U cubesat format
- 2) Demonstrate the ability to capture tunable snapshot hyperspectral imagery

- Benchtop camera was reduced in size to fit within the payload requirements for octocopter unoccupied aerial system.
- SNAP-IMS was integrated into UAS and collected hyperspectral data over NASA test area.

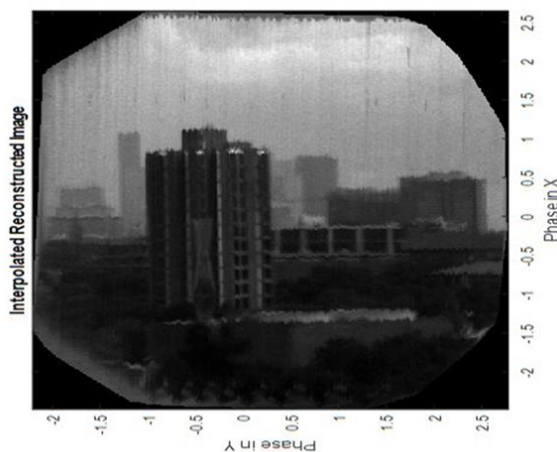
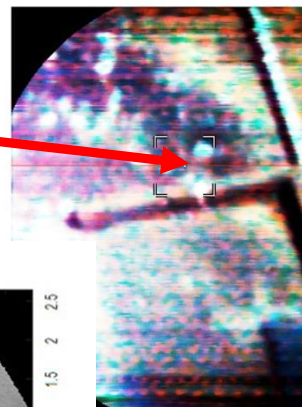


Camera produced image data in a matrix of 350x350 pixels x 66 layers and written to .tif files. Each layer is a spectral channel-spectral channels range from 473 to 668 in 3 nm increments. Initial processing of data into RGB files shows discernible structure. Left image shows concrete retaining walls. The bright dot is sunlight reflected off a convex mirror.

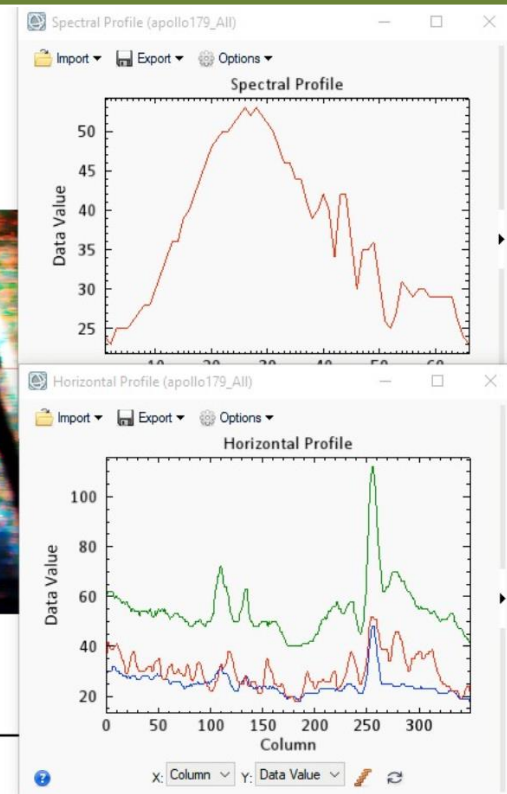
- Processed data is calibrated to sunlight reflected from mirror in the scene.
- Spectral data can be extracted from individual pixels.



Reconstructed image of scene over NASA test area.



Reconstructed test image of downtown Houston TX.





This activity supports the desire of the MSFC Earth Science Office to develop small instrument payloads suitable for collecting data from various platforms such as cubesats, small sats, UAS of various sizes and occupied aerial vehicles.